The input unit of claim 8 corresponds to input 101. The thresholding unit of claim 8 corresponds to thresholding 103, which thresholds the signal output by input 101 by comparing the signal therefrom with a threshold value. The calculating unit of claim 8 includes at least blocks 115, 301, 311, 117, 313, 109, and 111. The calculating unit calculates a threshold value to be used for thresholding a succeeding pixel and calculates the threshold value based on the first image signal, which is output from input 101, the second image signal, which is output from thresholding 103, and the threshold value used for generating the second image signal, which is output from threshold value generator 111. As can be seen in Figure 24, the subtracting unit 115 subtracts the threshold value TH(x) from the output of inverting unit 113, which corresponds to the second image signal. See the last two lines of page 9. The subtracting unit 301 subtracts a value before thresholding process, i.e., the first image signal from the result of the thresholding process, i.e., the second image signal. The outputs of the subtracting units 115 and 301 are then processed to generate the modified threshold value.

Thus, the calculating unit of claim 8 calculates the threshold value based upon at least, the first image signal and the second image signal.

In contrast to the present invention, *Bannai* discloses an image processing apparatus that includes, as illustrated in Figure 1, a binarization circuit 1 and a threshold value setting circuit 2. The binarization circuit 1 receives original input data 100, as well as a threshold value 300 and a signal 350 representing the average density of the binary data around the object pixel. Both of these signals originate with the threshold value setting circuit 2. See Figure 1 of *Bannai*. The binarization

circuit 1 also receives data from an edge detection circuit and a window judgment circuit.

Figure 6 represents a more detailed view of the threshold value setting circuit 2. It is clear from both Figure 1 and Figure 6, the only input to the threshold value setting circuit 2 is the binary data 200 output from the binarization circuit 1 and a clock pulse. The threshold value setting circuit 2 does not receive any data corresponding to the original image 100.

In forming the rejection of claim 8, it is alleged that the calculating unit of claim 8 corresponds to the binarization circuit 1 of *Bannai*. However, the binarization circuit 1 of *Bannai* outputs only a modified or binarized image signal. The binarization circuit 1 does not output any data corresponding to the original input image 100. Furthermore, the binarization circuit 1 of *Bannai* does not output a threshold value. It only outputs a binarized image signal. Accordingly, the binarization circuit 1 of *Bannai* cannot correspond to the calculating unit of claim 8 because the calculating unit of claim 8 outputs a threshold value, whereas the binarization circuit 1 of *Bannai* outputs a binarized image value.

Furthermore, the threshold value setting circuit 2 of *Bannai* also does not correspond to the calculating unit of claim 8. The threshold value setting circuit 2 of *Bannai* calculates the threshold values based only on the binarized image signal output from the binarization circuit 1. Accordingly, it does not calculate a threshold value based on a combination of a first image signal, a second signal, and a threshold value used for generating the second image signal. The Examiner alleges that the threshold value for succeeding pixels inherently is based on the current threshold value. Whether or not this is true, it is significantly different from an

apparatus that receives at least three separate signals and uses the three separate signals to calculate a new threshold value. Accordingly, both the binarization circuit 1 and the threshold value setting circuit 2 of *Bannai* operate significantly differently than the calculating unit of claim 8.

Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection of claim 8 based on *Bannai*.

Claim 14 is a method which corresponds in some ways to the apparatus of claim 8. The method of claim 14 includes a calculating step of calculating, based on the first image signal, the second image signal, and the threshold value used for generating the second image signal, a threshold value to be used for thresholding a succeeding pixel. As explained in detail with regard to claim 8, *Bannai* does not teach or suggest such a calculating step. Accordingly, claim 14 is also patentable over *Bannai*.

Claims 1, 6, and 7 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Bannai* in view of U.S. Patent No. 5,553,166, hereinafter *Kakutani*. With regard to claim 1, the Examiner recognizes that *Bannai* does not disclose a changing unit for enlarging or reducing at least one of arrange of the first image signal input from the said input unit and a range of the threshold value calculated by the calculating unit. To overcome this deficiency, the Examiner relies upon the prior art discussed at column 2 of *Kakutani*. The prior art discussed at column 2 of *Kakutani* is set forth in JP 01-130945. For the convenience of the Examiner, a copy of a translation of the Abstract of JP 01-130945 and a copy of the Figures from JP 01-130945 are submitted herewith. The Examiner alleges that the prior art from *Kakutani* averts a delay in the generation of white or black dots thus enhancing the

quality of the output image. Accordingly, the Examiner alleges that it would have been obvious for one of ordinary skill in the art to modify the teaching of *Bannai* by providing a means for changing ranges of threshold values corresponding to changes and a range of input values as taught in the prior art section of *Kakutani*. However, the prior art of *Kakutani* does not teach a changing unit which changes a previously determined threshold value. The prior art in *Kakutani* teaches that the threshold value setting circuit 4 takes into account the density of the image signal when calculating the threshold value. Thus, the prior art of *Kakutani* does not teach or suggest changing a calculated threshold value based on any criteria. It simply teaches calculating the initial threshold value based on certain criteria. Accordingly, the secondary reference relied upon by the Examiner does not teach or suggest modifying an image processing apparatus by adding a changing unit which would meet the criteria of the changing unit of claim 1, including, among other things changing a range of a threshold value calculated by a calculating unit. Both *Bannai* and the prior art of *Kakutani* teach or suggest a threshold value setting circuit which calculates a threshold value. Neither reference teaches or suggests adding to such a system a changing unit for changing a previously calculated threshold value.

Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection of claim 1.

The Examiner alleges that claim 6 is a method claim that corresponds to the above rejected apparatus claim 1. Claim 6 defines a method which includes a changing step of enlarging or reducing at least one of a range of the first image signal input in said input step and a range of the threshold value calculated in said calculating step. As set forth above with respect to claim 1, neither *Bannai*, nor the

prior art of *Kakutani* teaches or suggests changing a previously calculated threshold value. Accordingly, claim 6 is also patentable over the applied prior art.

Claim 7 defines an image processing apparatus that includes, among other elements, a changing unit changing ratio of a range of the first image signal input from the input unit and a range of the threshold value calculated by said calculating means. The Examiner alleges that the prior art *Kakutani* teaches such a changing unit. In fact, the prior art of *Kakutani* teaches a threshold value setting circuit 4 which calculates a threshold value on the basis of the density of the image signal. Although the output threshold value depends upon the density of the image input signal, the Examiner makes the conclusion that "a ratio of the two ranges does not remain constant". However, as set forth above with respect to claim 1, the prior art of *Kakutani* merely teaches or suggests that the threshold value setting unit 4 takes into account the image density when calculating the threshold value. This teaching does not teach or suggest a changing unit for changing a ratio of a range of the first image signal input from the input unit and a range of the threshold value calculated by the calculating means. Accordingly, claim 7 is also patentable over the applied prior art.

Applicants appreciate the Examiner's indication that claims 2-5 and 9-13 are allowable over the prior art and that claims 15-17 have been allowed.

In the event that there are any questions concerning this response, or the application in general, the Examiner is respectfully urged to telephone the undersigned attorney so that prosecution of the application may be expedited.

Respectfully submitted,

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